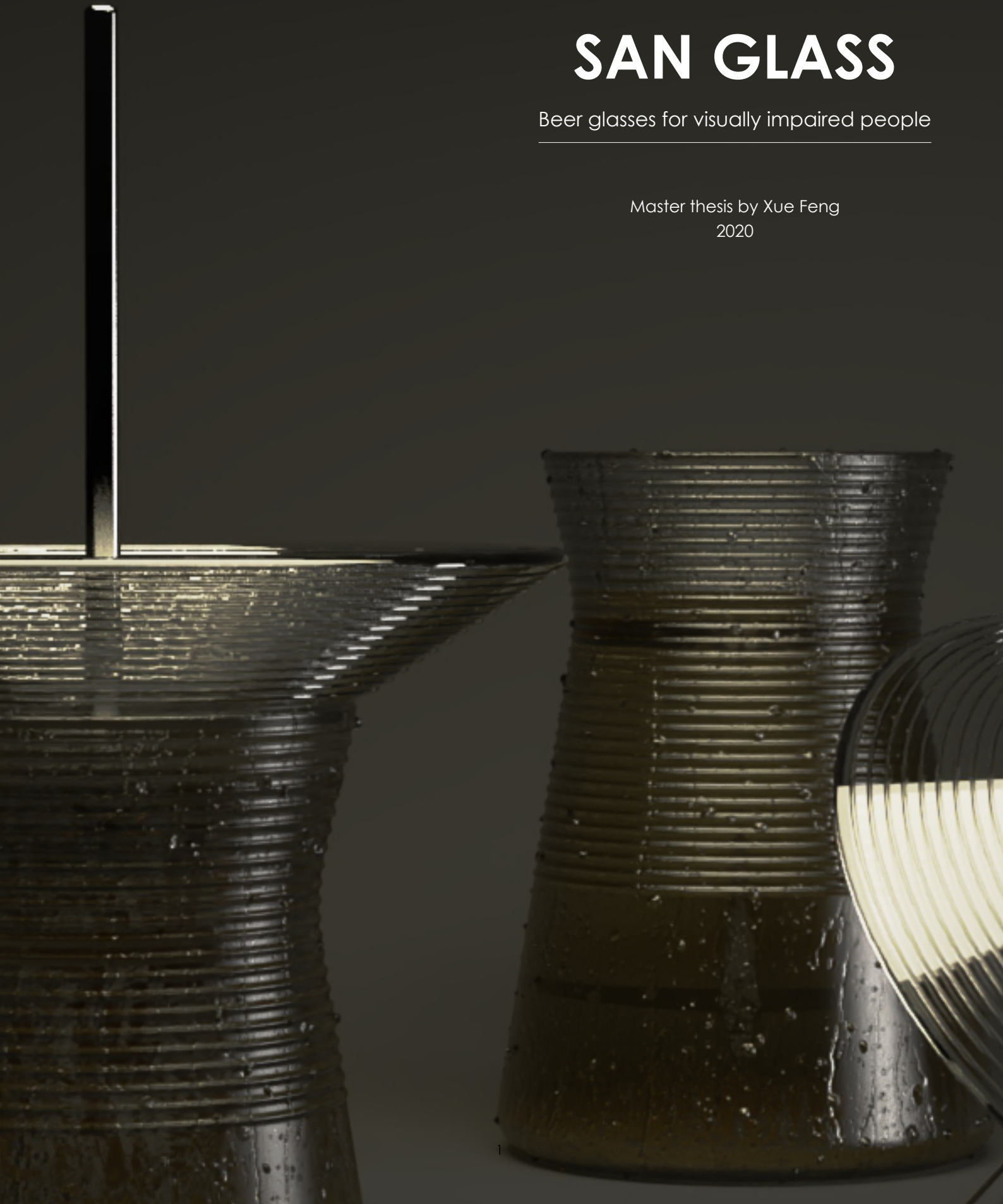


SAN GLASS

Beer glasses for visually impaired people

Master thesis by Xue Feng
2020



SAN GLASS

Beer glasses for visually impaired people

by Xue Feng

Degree Project for master of Fine Arts in Industrial Design

Main Field of study industrial design from

Lund University, school of Industrial design

Department of Design Sciences

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LUND UNIVERSITY

Summary

What is good design? There are thousands of explanations for this based on different people's perspectives. The term universal design has been around for decades, and this is one of definition for good design accepted by many designers. The key point of universal design is making design accessible to everyone. While many consumer products have been produced on the market do not match with this design concept, these products failed to satisfy diverse groups, like visual impairment. SAN glassware is a set of glasses design aiming at helping visually impaired people to get a better drinking experience.

Life always creates problems for people, and those people with visual impairment suffer more than sight people. Through the literature review and interview that I carried out to explore the food experience and eating behaviors of visually impaired people, I found out that visually impaired people can solve most problems by practice and assistive technology in their daily life, while there is one problem "pouring the beer into a glass and preventing foaming over" bothering them a lot. Then I was focused on analyzing this problem, tested out several ideas by experiments, and finally chose the design combining funnel with glass as a final solution.

Through the design process, sketching, making mock-up, testing, building 3D-modeling, exploring materials, and making prototypes, SAN glassware has been transferred from sketch to physical product.

Abstract

This project is aimed to gain an overview of visually impaired people's daily food experience and eating behaviors and to develop a design concept and product regarding the conclusion of the research.

The project is composed of three phases. In the first part, a general description and expected goal of the project is presented. The following section is research, including two methods: Literature review and Interview. From the Literature review, the factors which have an impact on visually impaired people when they do shopping, prepare meals, and eat out have been discussed. The interviews have been conducted with three participants via the internet, to investigate and identify obstacles they are facing in the areas of meal preparation and eating. In the final phase, entitled "design process", three main aspects are presented: design brief, idea exploration, concept generation, and final 3D models.

The final design is presented in illustration, rendering, and 3D-print prototypes.

Finally, a set of beer cups has been designed for visually impaired people to help them to get a better drinking experience. The research has limitations related to the size of samples and lack of close observation, and at the same time, it is impossible to organize user tests because of the outbreak of COVID-19. The outcome could end up with more possibilities if more interviews and user tests were conducted.

Acknowledgment

Thank you to my supervisor Olof Kolte and examiner Anders Warell.

A special thank you to those people who shared their knowledge and service during this project.

Motivation

My eyesight is always something I rely on constantly. I could not imagine my life without vision since I am curious about blindness and the blind. How could they find the items that they want to purchase in the supermarket? How could they read through books and type on the computer? How could they cross the busy intersection by themselves? Every simple task in daily life could be a challenge for them. While there is a famous activity called "Dialogue in the dark" (Dave, 2012) where sight people can explore the unseen and learn to see in darkness, which has been organized in more than 41 countries throughout Europe, the Americas, Africa, and Asia. There are many sighted people taking part in this journey to gain the experience of blind life, including having a walk in the park, shopping in a supermarket, or visiting a cafe shop, in the specially designed darkrooms. During this journey, visitors are always led by tour guides in various locations, so this could not represent real blind life. I think the most efficient way for me to gain an understanding of blind life could be getting closer to them and talking to them.

There is a Ted talk "Making the world accessible" (Power, 2014), which says that the biggest challenge for the visually impaired people to find jobs is not technology, but the rest of the world. From this video, I realized our society probably did not give enough respect and help to the visually impaired people. This made me start to think about whether I, as a designer, put some effort into changing the current situation the visually impaired people are facing or make their life better. Then I watched a lot of videos on YOUTUBE where I found some possibilities that I can contribute to making some change for visually impaired people. Therefore, I decided to start to take the first step measurement, reading articles related to them, and getting in touch with them to gain an overview of their daily life and understand their needs.

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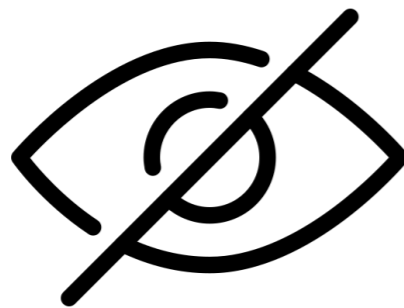
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The visually impaired people

01

Introduction

Background and purpose of my project

Background

why was this topic ?

The seven principles (equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and size and space for approach and use) of universal design, can be a key measure of success for consumer products. Referring to the definition of one of the universal design principles -equitable use is "The design is useful and marketable to people with diverse abilities"(Authority & Design, 2020), many products did not comply with the criteria. These products are mainly aimed at able bodies without considerations of people with an impairment, like visually impaired people. Besides, visual impairment is also a major global health issue. According to the data from the WHO (Pascolini & Mariotti, 2011), the number of visually impaired people is more than 2.2 billion in 2019, and the number is predicted to double by 2030. For these two reasons, designing products for visually impaired people could be a good scope.

Blindness is known to have a lot of impact on people's daily life. There is a lot of limitation for visually impaired people, and all the simple tasks, like preparing meals for themselves or purchasing food in the supermarket, become very tough for them (Tindall, 2014). They require special education or orientation and assistive technology to enable them to use other senses to function more effectively (Bilyk et al., 2009). It is also a fact that visually impaired people had a higher prevalence of depression compared with sighted people (Evans et al., 2007).

Moreover, one study presented that there is a relation between daily activities and the level of depression among visually impaired people. Vision impairment harms their social function and reduces independence since they are more likely to gain a feeling of distress and hopelessness (Osaba et al., 2019). As a result, minimizing the challenges and simplifying their daily tasks in their daily activities could be a useful way to help visually impaired people keep away from depression. From the perspective of a designer, redesigning some "normal" products in the market or creating products complying with the definition of universal design where designers observe and analyze to help visually impaired people to have a convenient life as possible could be a point where designers can contribute.

There is a lot of research related to orientation and mobility skills, employment, and education have been carried out, but research regarding food experience and eating behavior of visually impaired people is scarce (Kostyra et al., 2017), and to be more specified, I would like to explore what influence visually impaired people's food experience and eating behaviors at home. The purpose of this study is to understand the challenges blind people face concerning cooking and eating and to identify needs I can address through product design.

What is Universal Design ?

making design accessible to everyone



Following 7 Principles (Authority & Design, 2020)

Equitable Use

Flexibility in Use

Simple and Intuitive Use

Perceptible Information

Tolerance for Error

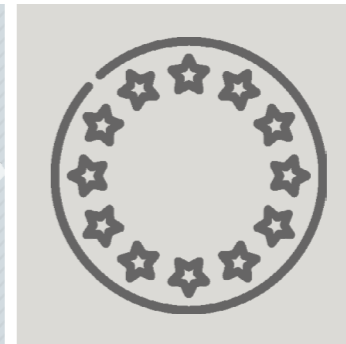
Low Physical Effort

Size and Space for Approach and Use

Number of people visually impaired and corresponding percentage of the global impairment by WHO Region and country, 2010

2.8 billion
visually impaired
people in the
world

65 %
of people
visually
impaired



889.2
million people
with vision
impairment in
Europe

82%
people of all
blind are 50
years and older



39
million are blind

02

Research

There were two methods applied in this research section

Literature review

Research method 1

According to the research topic " explore food experience and eating behaviors of the visually impaired people" and research question " how do visually impaired people prepare meals and have food at home", the first stage should be identified the relevant articles that related to meal preparation and eating behaviors of the visually impaired people from Google scholar and Lund University Libraries database. Keywords used for the search includes "the visually impaired people", "blindness", "visual impairment", and combines with "meal preparation", "food experience", "eating behaviors", " nutrition", " activities of daily living", "cooking tools". And then all the articles will be incorporated into the literature review.

Topic: explore food experience and eating behaviors of the visually impaired people

Research question:**how do visually impaired people prepare meals and have food at home?**

Keywords for searching:

nutrition
cooking tools
food experience
eating behaviors
meal preparation
activities of daily living

+

blindness
visual impairment
visually impaired people

Resources:

Lund university Libraries database
Google scholar

Food preparation

Content of literature review

Aversion to cooking

For visually impaired people, most of them learn cooking by themselves when they live alone, which is motivated by their basic needs of eating (Bilyk et al., 2009), while there are also three main other accesses for them to master cooking skills: guidance from their mother, high economics classes in high school, and instruction from rehabilitation workers, but they have a lot of difficulties to practice their skills. As a consequence, these instructions they got did not make a significant difference of their eating behavior and they tend to make simple food, " the largest possible foods prepared is twelve and includes the following items: toast or cereal, fresh fruits, salads or raw vegetables, sandwiches, prepared foods, meat and starch, meat starch and vegetables, pasta with sauce, meat and vegetable stir-fry with rice, vegetarian dishes, microwave popcorn, and cracker and cheese" (ibid).

Cooking instruction

There are three factors that most blind people are not really into cooking: a general disinterest in cooking, cooking for one, and cooking made more difficult because of their visual impairment (Bilyk et al., 2009). Most visually impaired people do not regard cooking as their hobby, and they describe cooking as a boring activity (ibid). Some of them live independently and have food by themselves since they lack the motivation and feel impractical or inconvenient to cook for themselves only (Jones et al., 2018). Besides this, cooking is also a time-consuming activity for blind people, which they could take up for more than two hours for dinner preparation, and some of them even take a much longer time (Jones & Bartlett, 2018). It is also a fact that a blind person might suffer from more difficulties than a normal person and concern much more about their safety, which can destroy their interest in cooking and make them fall into negative emotions (Bilyk et al., 2009).

Cooking problems











Blind people could encounter a lot of challenges during cooking. Ten problems have been identified by some research (Bilyk et al., 2009). The availability of braille cookbooks is limited, so they do not have a lot of possibilities to get recipes. (ibid) Organizing and locating items is also difficult for them. Even they try to keep foods in an orderly fashion (ibid). Before cooking, the visually impaired people need to do a lot of work, like peeling, chopping. The majority of the visually impaired people found that peeling vegetables is a difficult task for them, and they also declared that chopping is also a time-consuming task for them where they need to pay attention to keep themselves safe. (Kostyra et al., 2017) Even they try to do their best to make preparation and organization, they still face a lot of obstacles during cooking, including measuring ingredients, setting dials, dealing with hot elements, frying, determining doneness (Bilyk et al., 2009). Besides, hygiene is also a problem that they concerned about because they are not able to see dirt on vegetables, expiry dates, and moldy foods (Jones et al., 2018).

Cooking tools

There are mainly two kinds of tools, tools with speech output and low-tech tools, that are designed for blind people for assisting them to accomplish kitchen tasks. Speaking out is a good way to attract visually impaired people's attention, therefore many devices are working out in this way, such as talking kitchen scale, talking measuring jug, talking appliance timer remote thermometers, and liquid level indicator (BRASSAI et al., 2011). Another type of low-tech tool that they used in food preparation, like common cooker, "finger tongs", different sizes measuring cups, palm peeler, and tomato slicer also can help them reduce the challenge of cooking and make them safe.

Cooking tools

Two categories of kitchen tools:
tools with speech output and low-tech tools

Speech output		
		01
talking kitchen scale	talking measuring jug	
		
remote thermometers	liquid level indicator	talking appliance timer
Low-tech tools		
02		
	different sizes measuring cups	double-sided pan
		
tomato slicer	"finger tongs"	palm peeler

Summary

Conclusion of literature review

There are still a lot of activities that are difficult for visually impaired people. When there is no external help from sighted people, they need to deal with these problems independently. As a result, many tools and products have been presented in the design field for helping visually impaired people to reduce the obstacles. After evaluating all these types of products, I notice that meal preparation is one of the biggest challenges for blind people in their daily life. And at the same time, I did not find out any articles about eating behaviors of visually impaired people. Therefore, I would like to explore more knowledge of eating behaviors and meal preparation around visually impaired people and try to find out some design points where I can create some products to help them overcome some challenges and gain independence.

Interview

To gain a deep insight into the meal preparation and eating behaviors of the visually impaired people, semi-structured interviews were conducted with 3 participants.



Participants

3 visually impaired people



Methods

Skype/WhatsApp



Interview questions

(for interview questions, see Appendix, page 74)

About 40 questions

Interview plan

How to carry out my interview

01 Looking for participants

The research comprised 3 respondents of the visually impaired people who live independently. They can manage their daily living tasks like cooking, cleaning and shopping without the help from sighted people. There are three ways for recruiting participants. First, getting the contact through Rehabilitation Engineering and Design of the departments at LTH. Second, trying to look for the visually impaired people from the disability community in Malmo. Third, asking to recruit from a friend's large pool of potential participants.

02 Methods

If all the participants are from Sweden, face to face communication would be the best choice, otherwise interview will be completed by Skype or WhatsApp. The whole process will last approximately 30 minutes each. During this process, answer will be recorded by note-taking or recording if participants agree with this.

Interview question 03

(for interview questions, see Appendix, page 74)

The interview consists of three main sections: I. basic information II. Meal preparation III eating behaviors. The section I aims to identify whether the participants belong to the target group. Section II focused on meal preparation regarding the independent respondents without help from sighted individuals. All the questions are designed to figure out what problems they are facing during the cooking process. The meal preparation processes can be divided into three steps: before cooking, during cooking, and after cooking. Section III In this part, the participants will share their experience of having food at home, including eating and drinking.

Interview report

Summary of interview

Interviewees

There were three participants, Parham, Safkan, and John taking part in this interview. All of them are blind and only have little light perception. I got all these contacts by friends introduce. All these participants complied with the criterion, vision loss, and capable of cooking without help from sighted people. Parham lives together with his wife who is also blind in Netherland, and Safkan and John live independently. These participants master cooking techniques for some years and cook almost every day.



Safkan

An English teacher based in Turkey

Blind from birth

Only see 1% light

Living alone

Cook almost every day



Parham

Work in the IT field in Netherlands

Leber's Congenital Amaurosis

Only see light

live with a blind partner

Partner does most of cook, but he does cook as well



John

Run own business in Germany

Blind from birth

Only see 1% light

Living alone

Cook almost every day

Interview methods and methodology

These three interviews were all conducted via the internet because all of them are from outside of Sweden. I had a time skype interview with Parham and many emails exchange during my research phase. I picked out the most related information on the topic that was discussed via emails, written down by question change, and 10-15 minutes worth of word-to-word transcript of the interview. There were 4 times of interviews conducted with Safkan. I did record for one interview and made a word-to-word transcript. There were three more interviews that I recorded by note-taking as a supplement to some questions. I had a one-hour interview with John and answers recorded by voice.

Safkan



- four times interviews
- did record for one interview
- made a word-to-word transcript
- did note-taking for other interviews

Parham



- one skype interview
- many times email communication
- made a word-to-word transcript

John



- one skype interview
- made a word-to-word transcript

Summary

main information of interview

01 Food selection

There is a lot of food that some of the visually impaired people will avoid buying and eating. Firstly, they do not like food with bones, like fish and drumsticks. Parham explained that,

" when it comes to eating, I can only think of drumsticks, fish with fishbones, and pancakes. Drumsticks because they are hard to de-bone cleanly with a fork and knife, and fish also because it's hard to remove the bones with a knife and fork."

Secondly, some pancakes also create difficulties for them to divide and pick up. Parham said

"With pancakes, it's hard because they are soft and squishy."

Thirdly, eating salad is also a hard process for them. John said that

" I would like to say salad. I find it too difficult to eat. I do not know which can be the right way to put the salad into my mouth. I will check each bite with my knife before putting it into my mouth and cut off the pieces that stick out too much. This is a too complicated process for me."

In contrast to this, simple food, like slices of bread, sandwiches, toasties, is popular among them.

02 Drinking

These three participants do not face any huge problem during the drinking process. All of them mentioned that they are into coffee and tea. Based on the drinking process for tea and coffee, pouring hot water into glass could be a big challenge for them. However, with the help of a liquid level indicator, they can avoid burning themselves successfully. They also enjoy drinking different types of beverages, wines, beers, whiskey in their life. Some problems that they mentioned when they describe their drinking experience of having a glass of beer.

John described the process,

" My only concern probably is that I pour beer into a glass. I always pour it very slowly and sometimes give it a break. It takes some minutes to do that. Because of this, I drink it from bottles directly, but sometimes I knock down the beer bottle. While I still prefer to drink beer from a glass, which gives a better drinking experience. "

Safkan expressed similar frustration,

"One problem for me is that when I pour beer into a glass, I hold the glass at a steep angle, almost horizontal, and lower the glass as it fills. Even I follow this instruction, the foams still overflow."

Another problem is that when they make mixed drinks, such as cocktail and latte, they find out it is too difficult to control the proportions of different ingredients. Parham explained that,

"One problem we have here is filling up a glass with different ingredients. Some recipes talk in proportions, and not weight. For example, when you are making a latte, you pour in the milk to a certain point and then pour the espresso on the top, so I would have to do calculation about how much milk and coffee I need "

This is a quite complicated process and a time-consuming task for him.

03 Cooking

They all live independently and are capable of cooking basic meals for themselves. There are two ways for them to overcome most problems during cooking. They would like to cook similar food daily. They will prepare all the ingredients first and place them in order, and through practice, they know exactly the location of the stove and how to handle the whole cooking process. This means they can avoid almost all the burns and messes. On the other hand, A lot of products in the market can help visually impaired people to simplify cooking tasks. For example, they can buy pre-cut vegetables and meats from supermarkets, use a slow cooker instead of the stove, or mixer to avoid cutting. However, measuring is still challenging for them. They rely heavily on their feeling to measure the ingredients during their cooking process. Safkan mentioned that he did measurement by using a finger to feel,

"I normally only put salt into my food. I use one very small normal spoon and I usually put two spoons into my food. Sometimes, my fingers can feel how much salt I get in that spoon. I feel that I have a high sensibility to my fingers. If the amount of food changed, I may put extra or fewer ingredients than I need."

John use the same way as Safkan for measuring ingredients,

"I do it by feel. I have some different sizes of cups. Depends on the different situation, I choose a special size and then measure the ingredients by feel. Of course, sometimes, I make mistakes. I also sprinkle on my hand, so I know how much I am adding."

Parham said that,

"The scale we have is not that good. We use differently-size spoons for measuring things, like a teaspoon, half a teaspoon, and so on. We use a talking scale for weighing things, and we use differently-size cups for different cup sizes."

As a result, they cannot do measurement precisely. They have difficulty to make sure that they always put the right amount of ingredients for their food.

Discussion

Two problems for visually impaired people

Visually impaired people can take care of themselves independently in their daily life. They can manage all the daily tasks, such as buying, cooking, and drinking, and avoid almost all obstacles by practice or with the assistance of some special products in the market. Nevertheless, I found out they still face two problems, measurement problems and pouring beer into a glass, which they have not to figure out a better solution.

01 Measurement problems

There are two problems they mentioned related to measurement.

One is that they cannot make measurements precisely when taking ingredients for cooking because they mainly rely on the sensibility of their fingers rather than assistance tools. There are a lot of different kinds of talking scales that have been produced on the market to reduce this problem. If they think this is a big problem for them, they can turn to use talking scales.

Another problem related to measurement is to make a mixed drink, like cocktail and latte. The key to this problem is that the recipes display in proportions, which means they need to do the calculation when they make different cocktails regarding the capacity of glasses. One possibility to simplify this process is making the same volume cocktail and using the same capacity glass every time. While even they follow this suggestion, they might not remember the number clearly. This means calculation is an inevitable process for mixing drinks.

02 Pouring beer into a glass

The main problem of pouring beer into a glass is that the foam probably overflows. I think the most direct way for solving this problem should be drinking beer from the bottle, while they mentioned that drinking beer from glass provide them with a better drinking experience. Then I post out a question "how do you pour beer into a glass without foam up everywhere?" in the blind community on the Facebook group. I got 13 comments about this question. There are some ways they are taking to solve this problem.

"Pour a little, then wait for the sound of the foam to go away before pouring more. Do this until you reach close to as far down as you have your finger looped over the edge if you use that technique. If not, and if the beer is cold, you can judge where to stop by feeling the temperature change on the outside of the glass. This works for soda as well."

It is obvious a time-consuming solution.

"Make sure you are using a big enough glass and pour slowly into the center of the glass. If you are pouring a 12-ounce bottle or can, use a 16- or 20-ounce glass. Tilting the glass and pouring slowly will keep the beer from foaming, sure, but then you are drinking all that air. You do want the beer to foam some when pouring so it releases some of that carbonation, so using a taller glass and pouring slowly into the center should do the trick."

Using a much bigger glass could be a way to reduce this problem. However, they still need to tilt the glass and make sure to pour slowly into the center.

"I endorse the glass tilting technique. It works for me. Of course, you can switch to drinking wine. It is less filling, though nothing beats a cold beer-after working outside on a hot day."

Switching to another type of drinking could be a way to avoid this situation. While the beer still has its advantage, which is irreplaceable.



Conclusion

Design point

There are a lot of tools aimed at helping visually impaired people have been produced in the market. With the help of these tools, they can fix almost all the problems in their daily life. The measurement problem they mentioned can be solved by talking scales. However, there are no products that have been designed for drinking beer aimed at the visually impaired people. The solutions they take are still complicated and time-consuming. Therefore, designing a tool for them to help them get a better drinking experience when they drinking beer could be my design topic.

03

Design

Beer glasses for visually impaired people

Design Brief

product features

The project aims to improve visually impaired people's beer drinking experience. According to the research, foam overflow is the biggest problem for people with vision impairment during the beer pouring process. Therefore, the author decided to design a beer cup to solve this problem.

In the following design part, the project mainly focuses on two design potentials to solve this problem.

- Increasing the beer cup volume
- Designing an accessory to separate beer and foam

Besides this, the beer cup should also have some other features.

- easy-to-clean
- easy-to-hold
- nonfragile
- stable

The anatomy of a beer cup

five elements for designing a cup

01

Volume

Holds how much beer in the cup

02

Mouth width

Effects on the spread of aroma

03

Wall thickness

perception of quality

04

Internal shape

How the beer flows out of cup











05

External shape

How the cup looks and feels

Market analysis

Different beer cups in the market

	H	Ø	C		H	Ø	C
	180 mm	86 mm	600ml		155 mm	90 mm	440 ml
	186 mm	82 mm	540 ml		180 mm	82 mm	630 ml
	175 mm	90 mm	480 ml		238 mm	81 mm	700 ml
	170 mm	95 mm	750 ml		220 mm	64 mm	425 ml
	205 mm	65 mm	380 ml		124 mm	110 mm	500 ml

Due to the popularity of beers in the world, there is a wide range of container styles. These are the most common shapes I found on the internet. From my observation, the majority of beer cups are made of glass and have no handles, while they have various dimensions regarding height(124-205mm), diameter(64-110mm), and volume(380-700ml). Since there is no common standard size for beer cups, in order to determine the size of my beer cup size, I decided to do further research.

Market analysis

Top 5 Largest Beer Companies in the world

 Brands	 Cans	 Bottles
		
		
		
		
		

There are various sizes of beer cans and bottles, from 222 ML to 750ML. Therefore I decided to create two different sizes of glasses ,450ML and 750ML to serve the most common sizes of bottles and cans of beer.

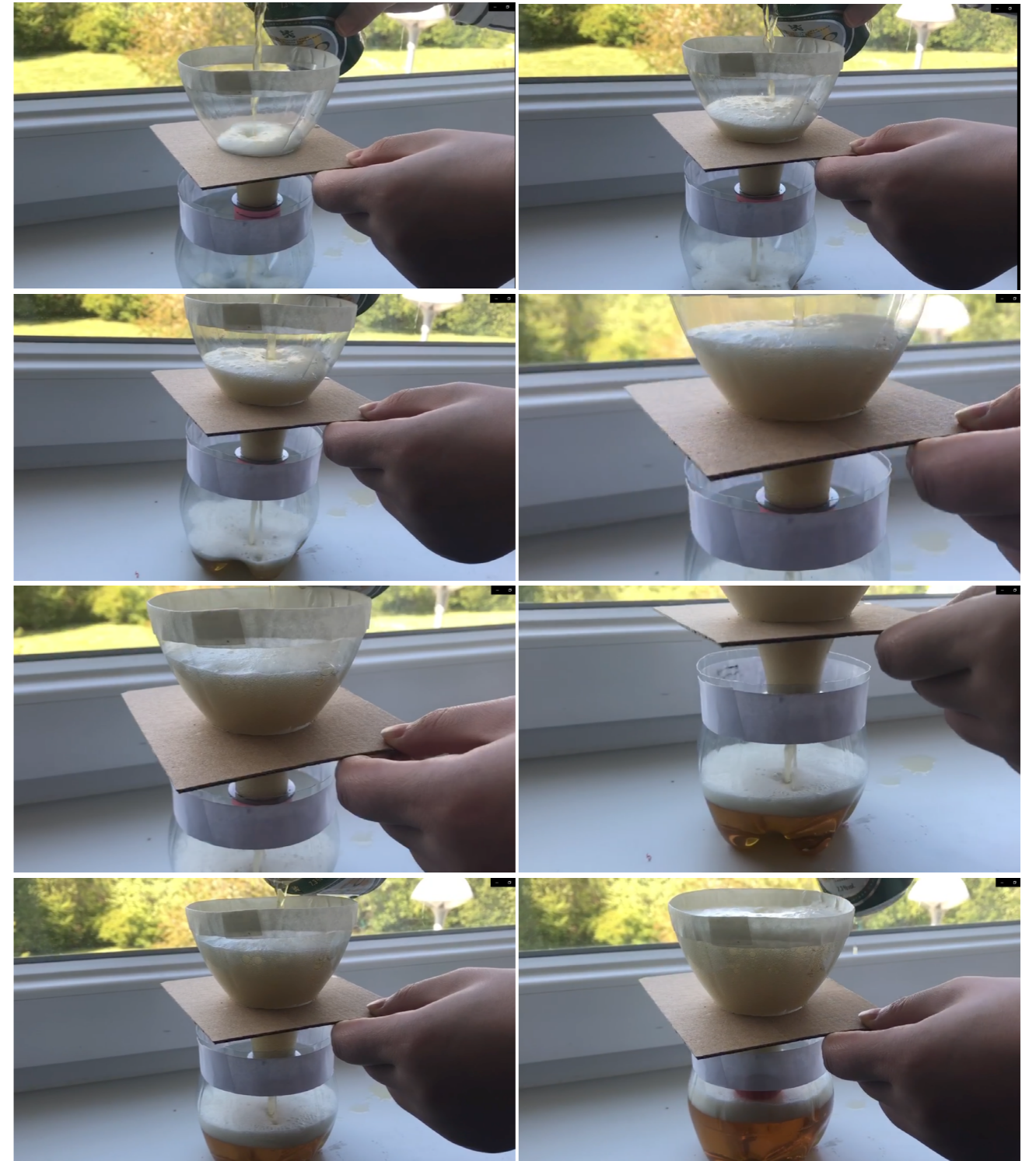
Explore ideas

Concept 2 glass + funnel



Experiment 450ML glass + 330ML beer

I made this quick mock-up (funnel with 6 holes and 450ml cup), in order to test whether the funnel can solve the foam overflow problem or not. I poured 330ml beer into the funnel. The liquid went through the funnel holes quickly while most of the foam stayed at the funnel part. As a result, this set up can be a potential solution for preventing beer overflow.



Concept 2
glass + glass



Experiment
450ML glass + 330ML glass+ 330ML beer

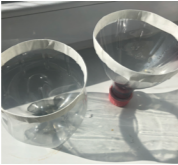
I made another similar test for my second concept. I stacked two bowls(400ml bowl and 500ml bowl) together symbolizing a double-layer cup. After pouring 330ml beer into the inner bowl, I found the foam overflowed along the wall of the inner bowl, turning into liquid quickly and storing it in the outer bowl. This concept could also solve the beer overflow problem.



Comparison of two concepts

Concept 1 VS Concept 2

These two designs both can solve the main problem, preventing foam overflowing. Besides this, I also need to consider some other aspects, including easy-to-pour-in, easy-to-wash, easy-to-hold, stable, and production. Based on the feasibility of these elements, the first design is much more better.

Features		
easy-to-pour-in	😊	😞
easy-to-wash	😊	😞
easy-to-hold	😊	😊
stable	😊	😊
production	😊	😞

Go for concept 1



Ideation

Sketching

concept 1+funnel + glass

Based on concept 1, this product has two parts(funnel and glass, so I was looking through some products that showing a good combination of these two parts. I found these coffee makers are quite similar to the shape I was looking for. Thinking about visually impaired people's needs, the shape of this product should be simple and stable, so the combinations in picture 1 and picture 3 are more suitable.



Following the inspiration, I made several sketches. These three sketches can comply with the standard of simple and stable. These three sketches have some common features. Cup part has a big bottom so it will be more stable than others and the funnel part has a large diameter on the top and small diameter at the bottom so it can be easy to place in the glass and stack on the glass.

3D-modeling

Following the rough sketches, I started to build out some 3D models to display my concept in a much detailed way.



I considered some other features, such as easy-to-wash and easy-to-produce, and I figured out this concept is better than others.

Further design

Exploring shapes

When I was doing further exploration, I was thinking about some products which have a connection with liquid and some traditional Chinese teacups and umbrella came to my mind by nature. I would like to incorporate these things into my design.



(Rockett, 2015)



(Yunnan Sourcing Tea Shop, n.d.)



(Molli, n.d.)

First version design



3D-Print



Design details

Why is this kind of shape?



- The glass has a big bottom and small top which can maintain good stability.
- Visually impaired people can feel the smallest place and hold at this place, which can help them notice where they can put their mouth.
- The diameter of the smallest part of the glass is 65mm. The average height of people is between 170-175 cm, so the length of the palm that people can hold is generally about 200mm, so a glass with a diameter of 65mm is suitable for gripping.

Design details

Why does this have a stick?

- This stick can help visually impaired people find the central of the funnel , so they can pour beer in the right position.
- The stick can be used as a handle to take away the funnel part.



Why I use glass as material for this glass?

Most blind people also use glass and ceramic glasses in their daily lives.

Why I use this texture?

This texture allows them to grip the cup better.

What is the wall thickness of this glass?

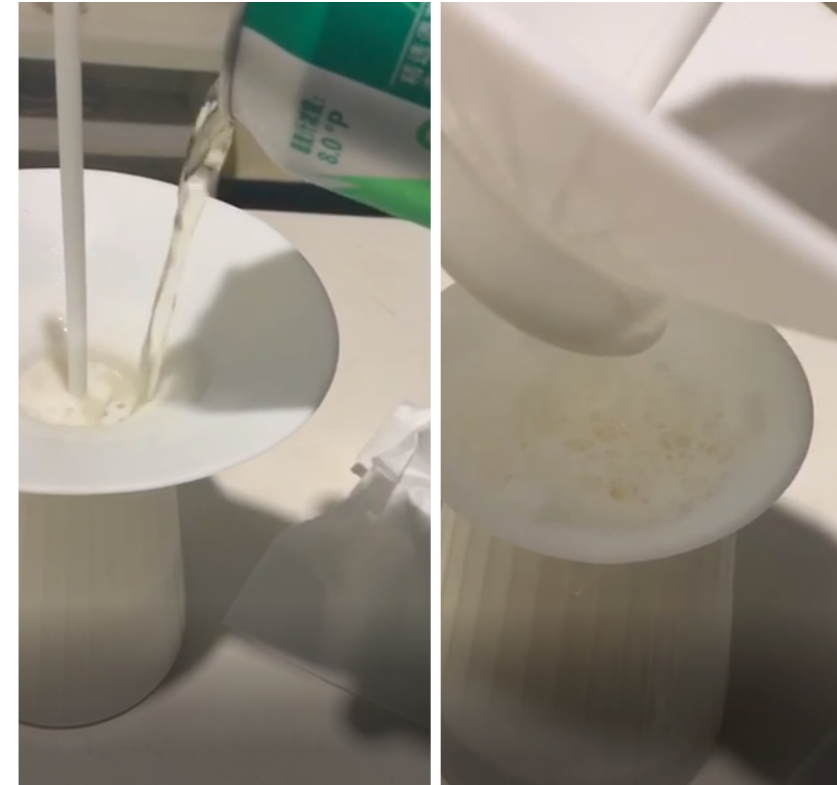
4mm. It is thicker than the normal glass in the market.

Testing

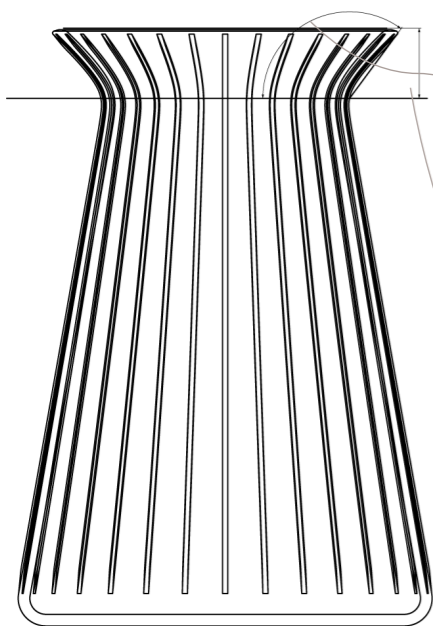
use 3d-print product to carry out test



To test out whether the shape of the glass is good for drinking. In the first step, I filled the glass with water. Then I drank the water from the glass. When I hold the glass at a very tiny angle as picture 1, I drank water smoothly, but when I hold in a little steep angle as picture 2, the water spilled towards my face.



To test whether this set up can store the foam and prevent it overflow. I prepared 550 ml of beer can. I poured it through the funnel. I found the beer and the foam went through the funnel directly into the glass and then the foam overflowed from glass. This result was different from what I found out before.



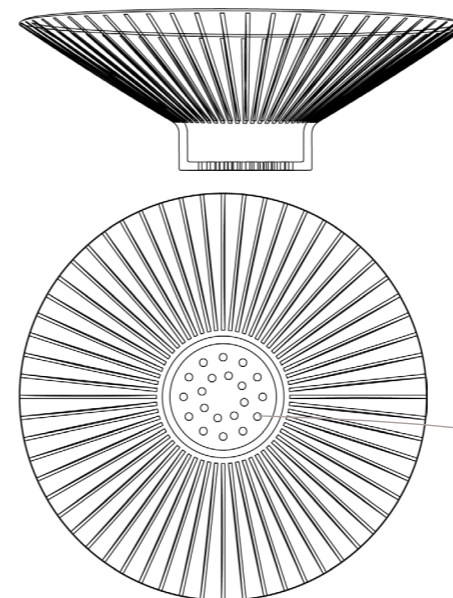
Why did I feel too difficult to use?

Too big angle?

120 degree angle. This angle is too big, which is more suitable for pouring instead of drinking.

Too short distance?

When I was holding the glass and drinking, my fingers touched my mouth.



Why did not achieve the desired results?

The foam flows directly into the cup instead of staying in the holes.

Is there too many holes?

Too big holes?

During initial experiment, i used 1-1.5mm holes, but this one is 3.5mm

Further experiment

Comparative experiment 1

- 1 450 ml glass + 330ml beer + funnel with 6 "2mm" holes
- 2 450 ml glass + 330ml beer + funnel with 6 "3mm" holes

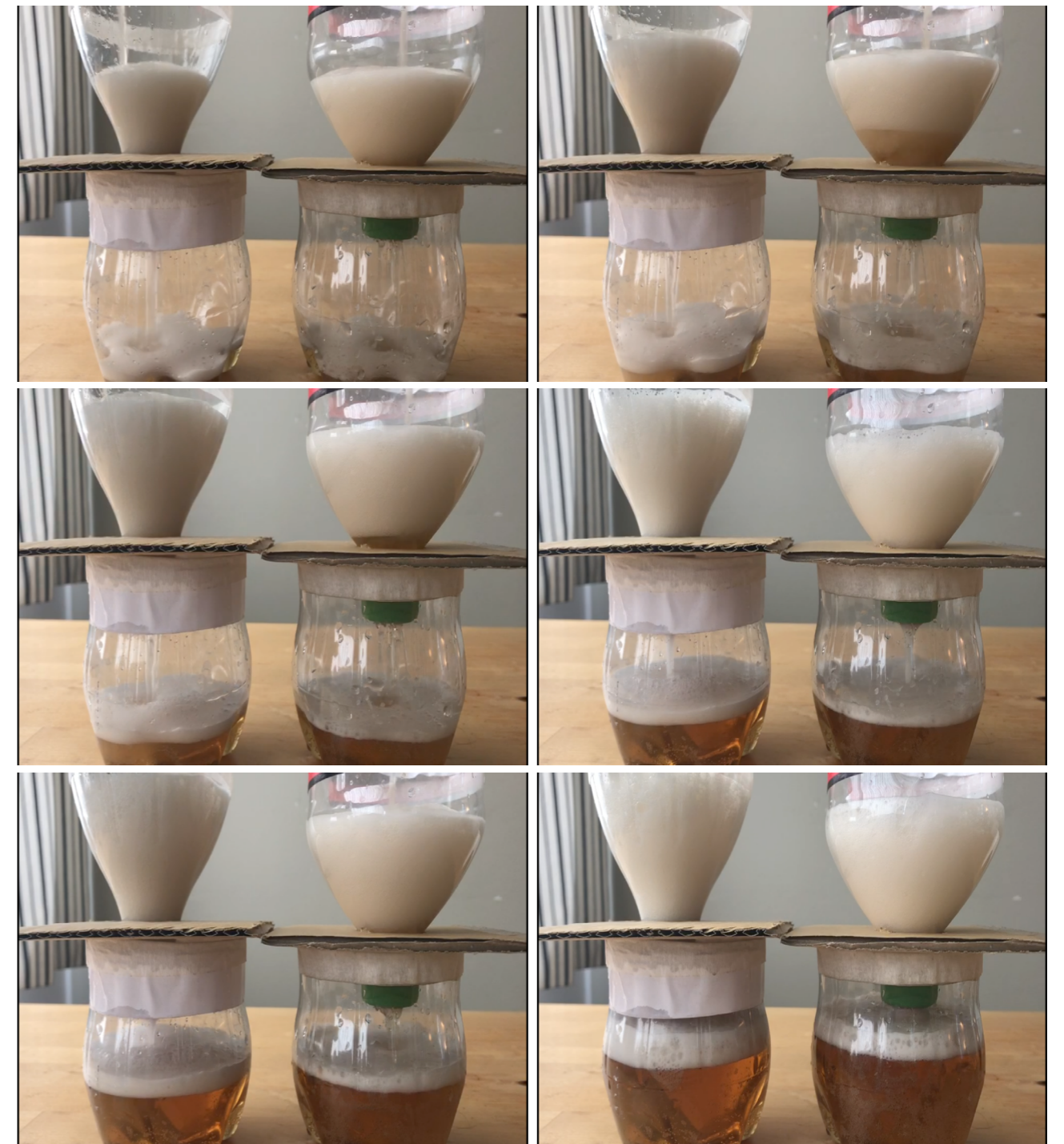
In order to find the right size of holes on the funnel, I made two different funnels, one funnel with 6 "2 mm" holes and another 6 "3 mm" holes for further testing. I poured 330 ml beer into each set up at the same time. I found out, more foam stayed in the funnel with 2 mm holes than the funnel with 3mm holes. 3mm holes on the funnel are too big for keeping most of the foam in the funnel. In the second setup, half of the foam went into the cup part, which might still cause the overflow problem. As a result, the funnel with 1mm holes is a better choice.



Comparative experiment 2

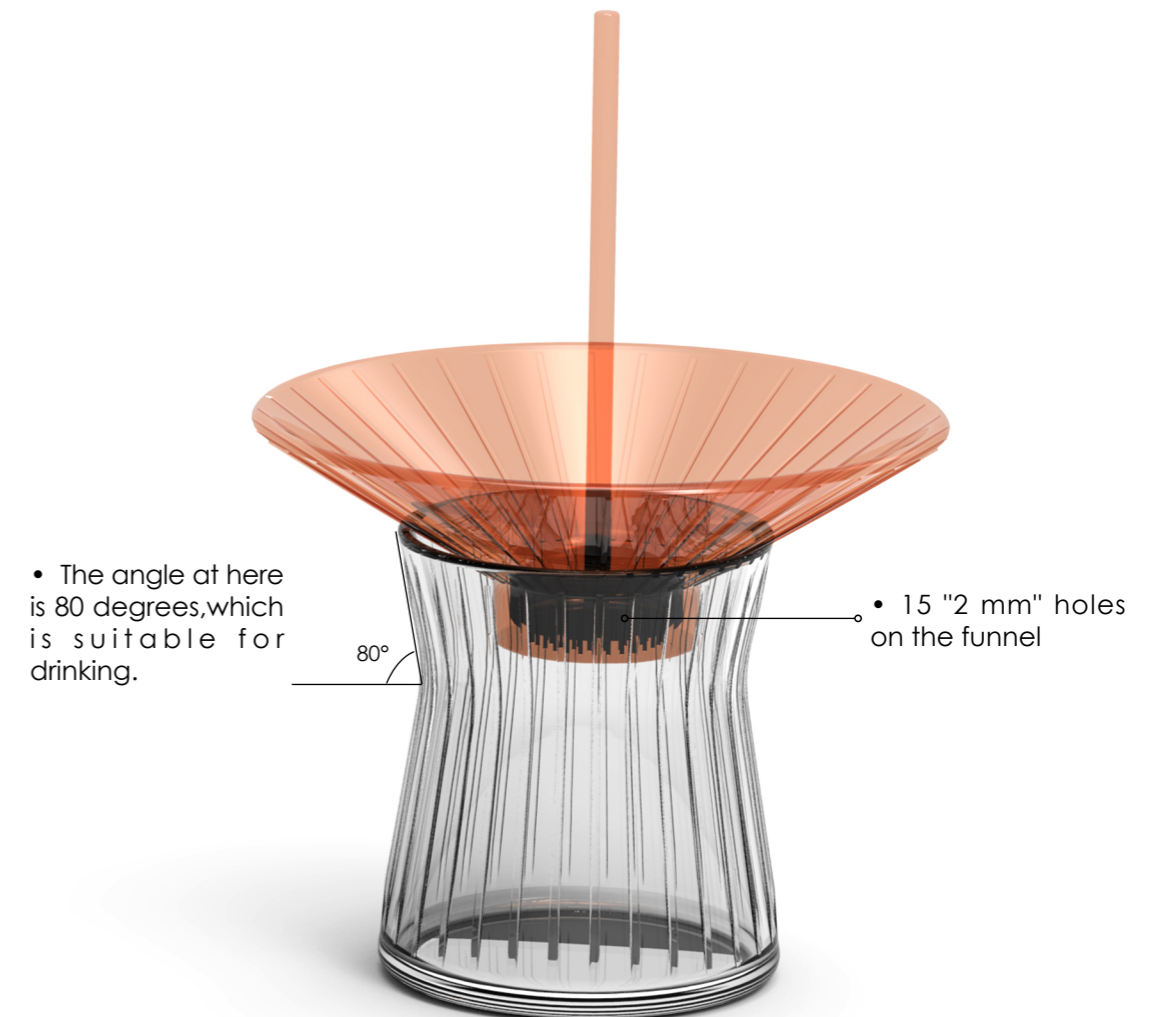
- 1 450 ml glass + 330ml beer + funnel with 6 "2mm" holes
- 2 450 ml glass + 330ml beer + funnel with 15 "2mm" holes

After deciding the size of the holes, I needed to figure out how many holes I should place on the funnel. I made another two different funnels, one with 6 "2 mm" holes and another one with 15 "2mm" holes to verify how different numbers of holes would influence the performance. I poured 330 ml beer into each set up at the same time. I found out, both set up could keep most of the foam in the funnel part, while in the second set up, there was slightly less foam in the cup part. Therefore, it is better to have 15 holes on the funnel.



Second version design

After all these testing and experiments, I tried to fix all the problems in my first version design. Then I came up with my new version of the design.



Before prototyping

3D print for making plaster models

When I started to make prototypes, I got some guidance from experienced people for making glass. I understood that it would be very difficult to make the vertical pattern on the surface of the glass. And if I wanted to make a pattern like this way, I had to make 10-12 plaster molds. This is really complicated and difficult. Besides this, the glassblowers prefer to have two-piece mold. Therefore, it is better to make patterns in a horizontal way.



It is too difficult to get a great surface when you making the vertical pattern by glass blowing. There are some pictures that I got from some experienced people. They said the pattern does not present in a way they want and the outer surface of the glass is uneven.



Third version design

glass with horizontal pattern

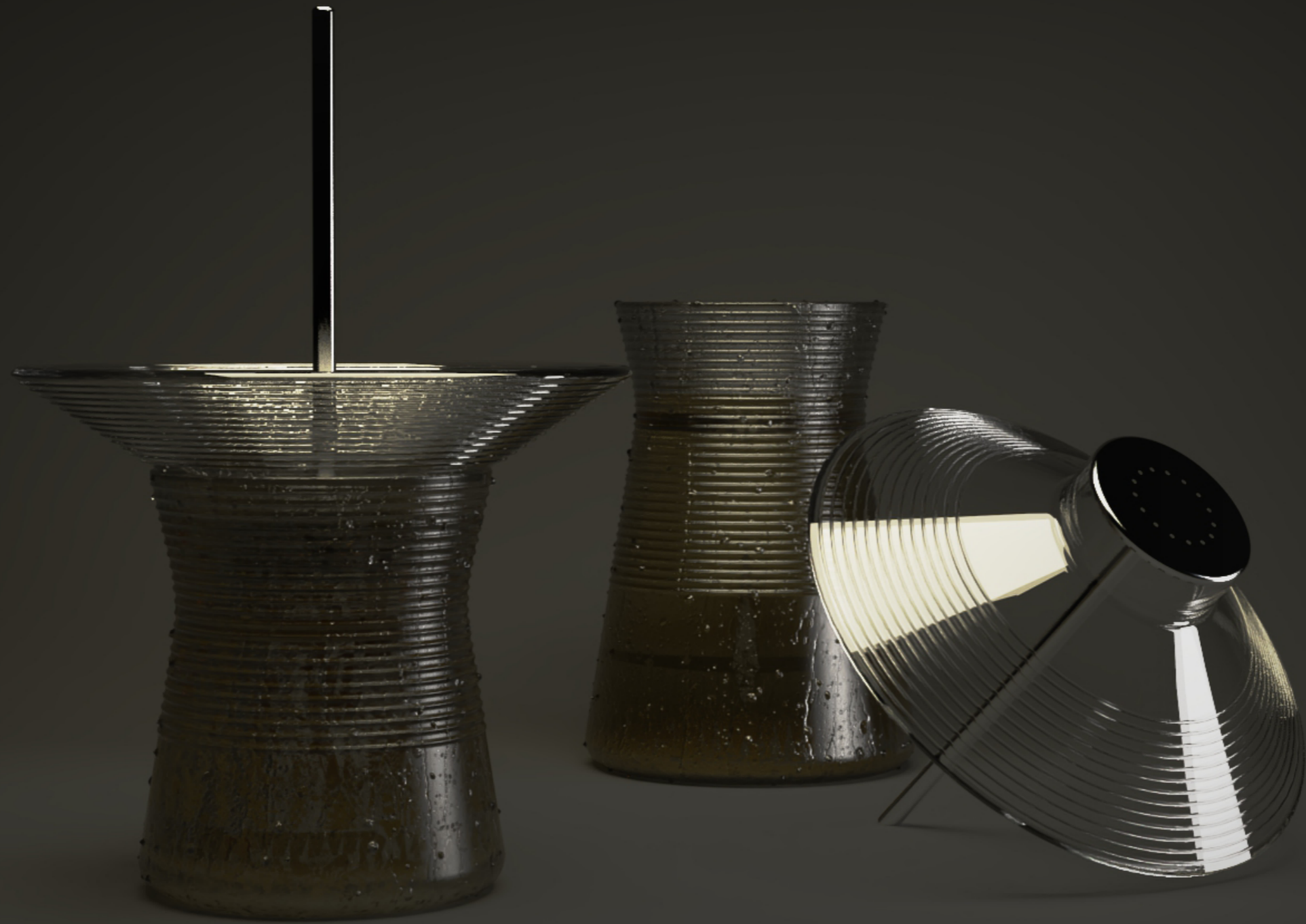




- If the stick is made of glass, it would be very fragile.
- It is very difficult to make holes on the glass

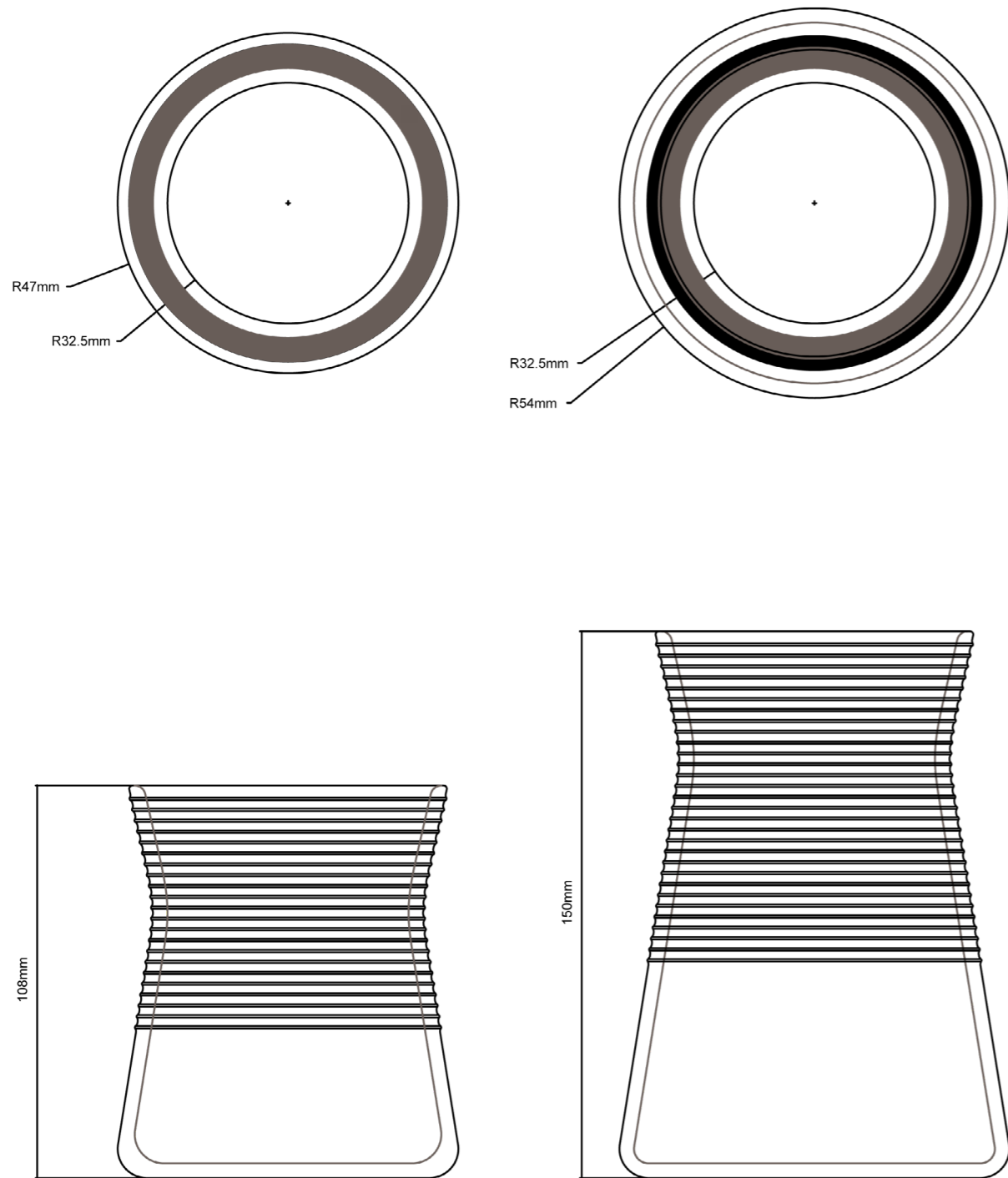


- Then I decided to make this stick and the bottom of the funnel by stainless steel.
- The stainless steel part connects with glass part by silicon.

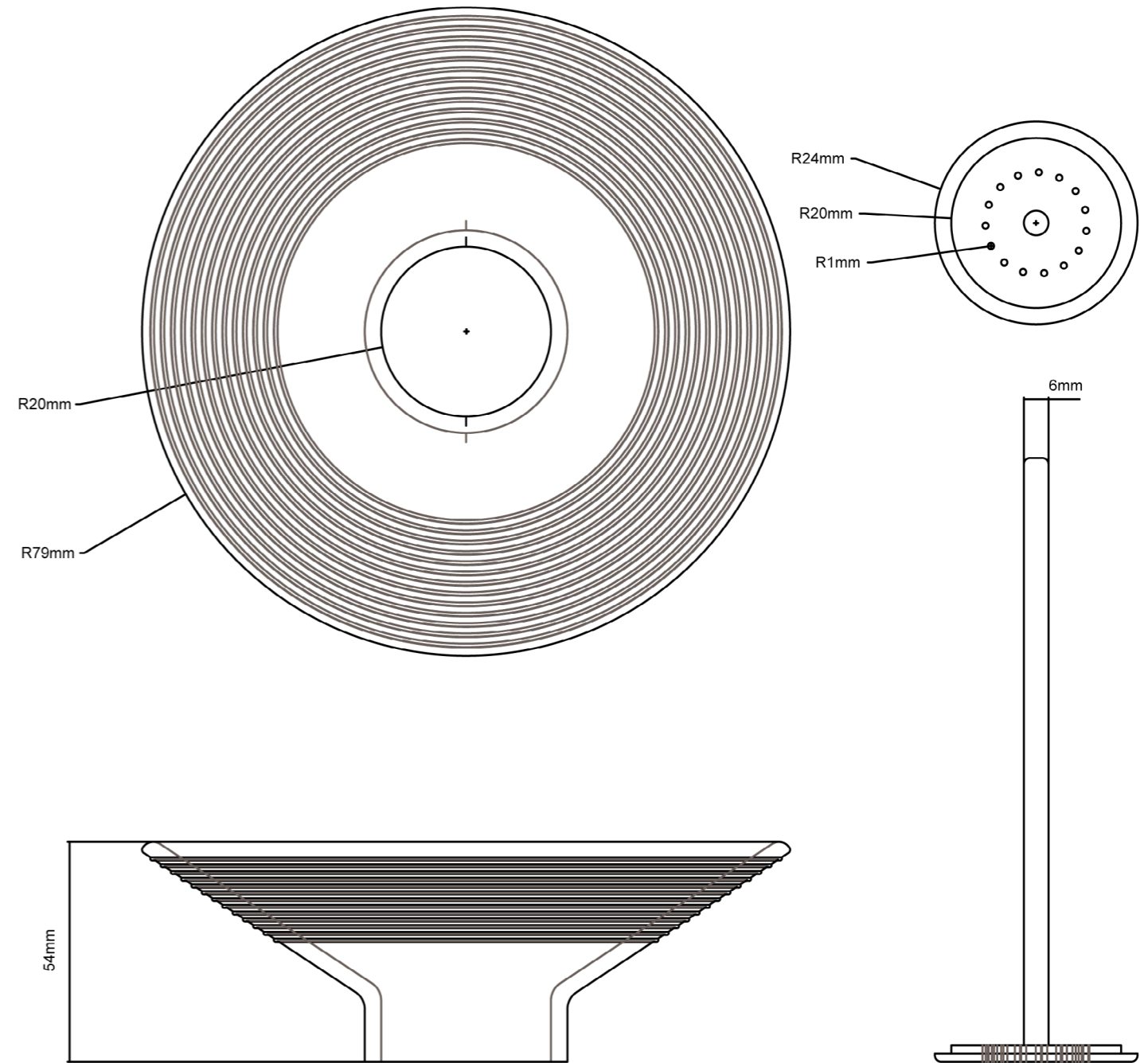


Dimensions

Small glass and Big glass



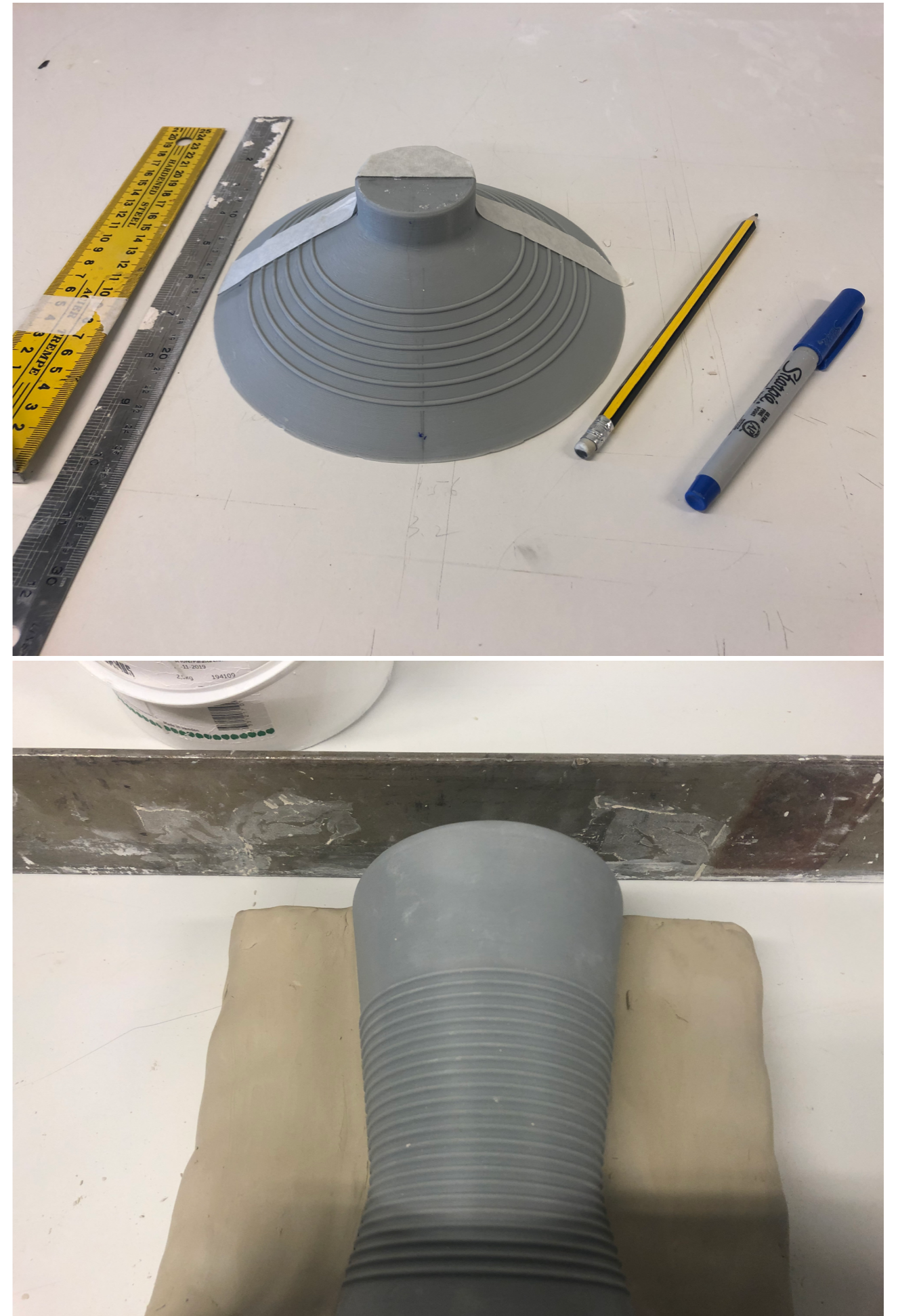
Funnel and stick part

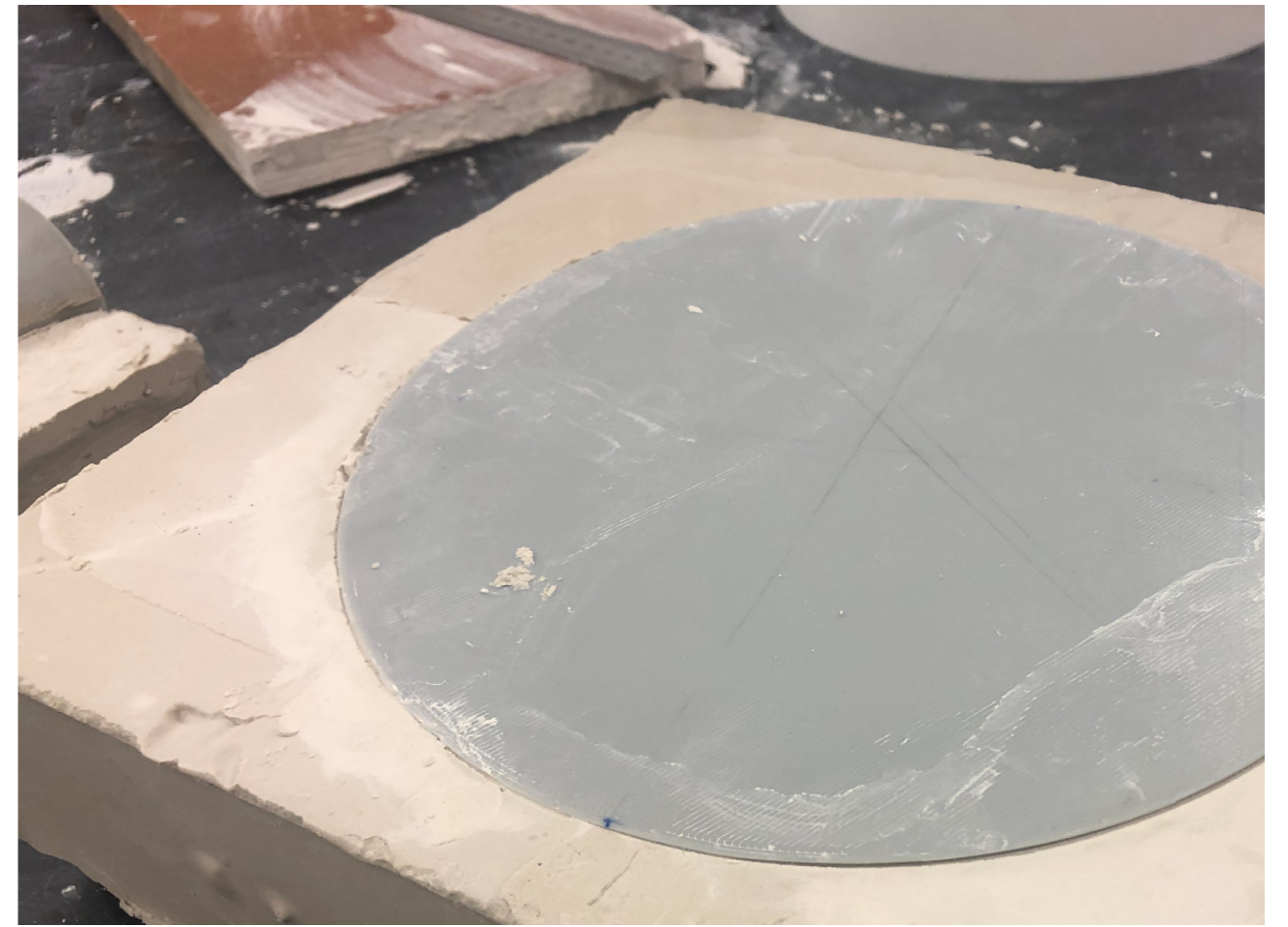
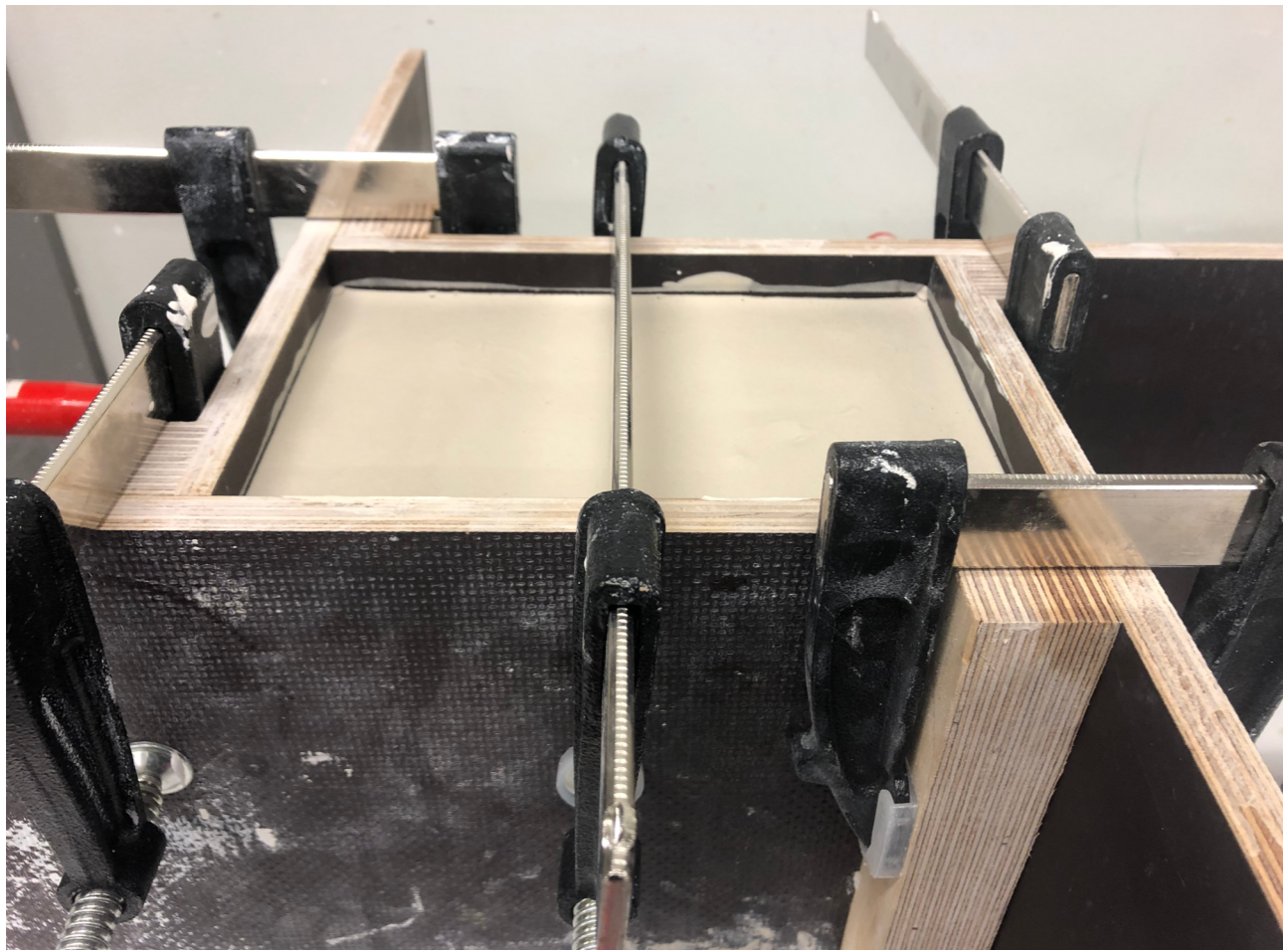
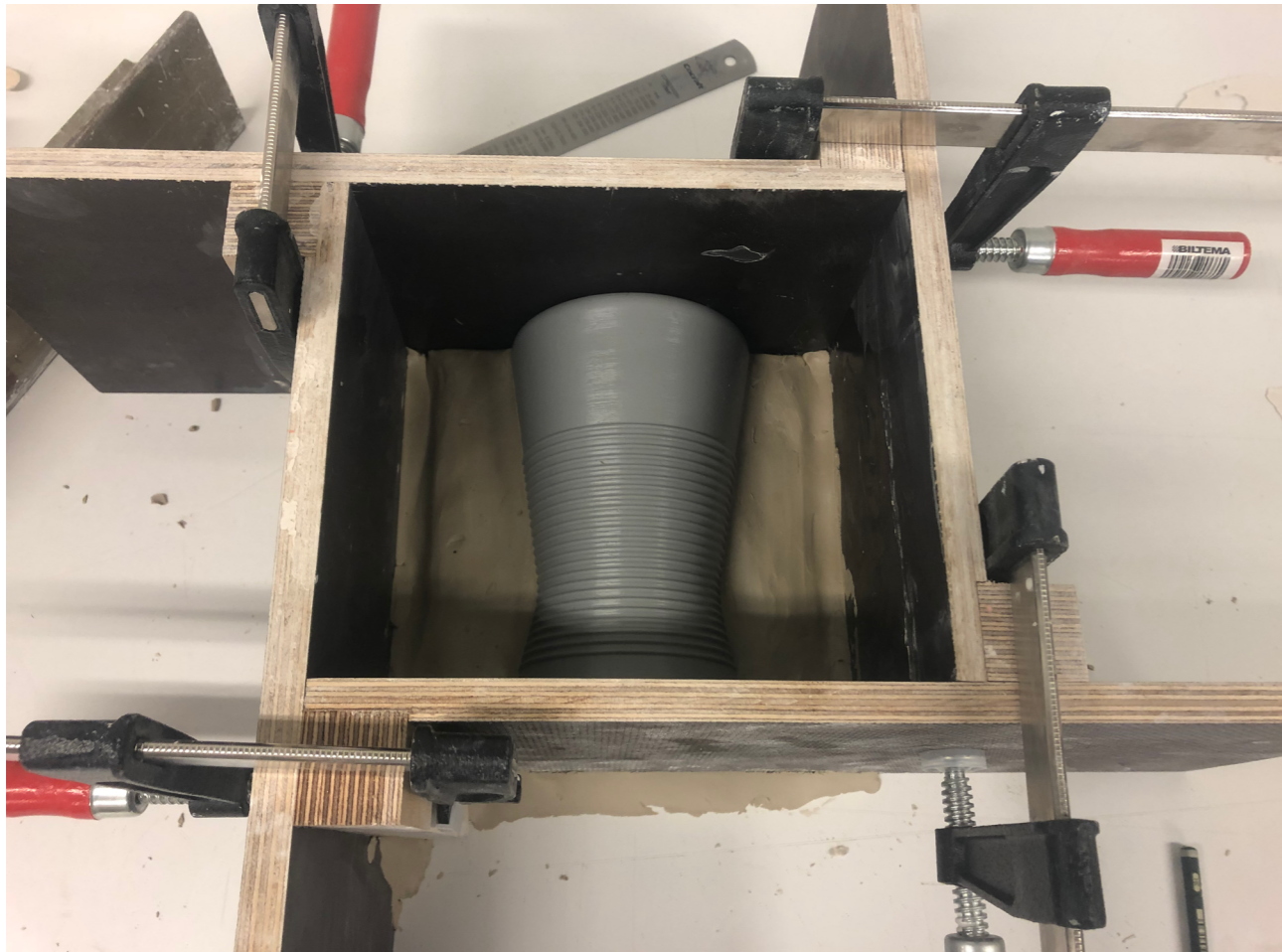


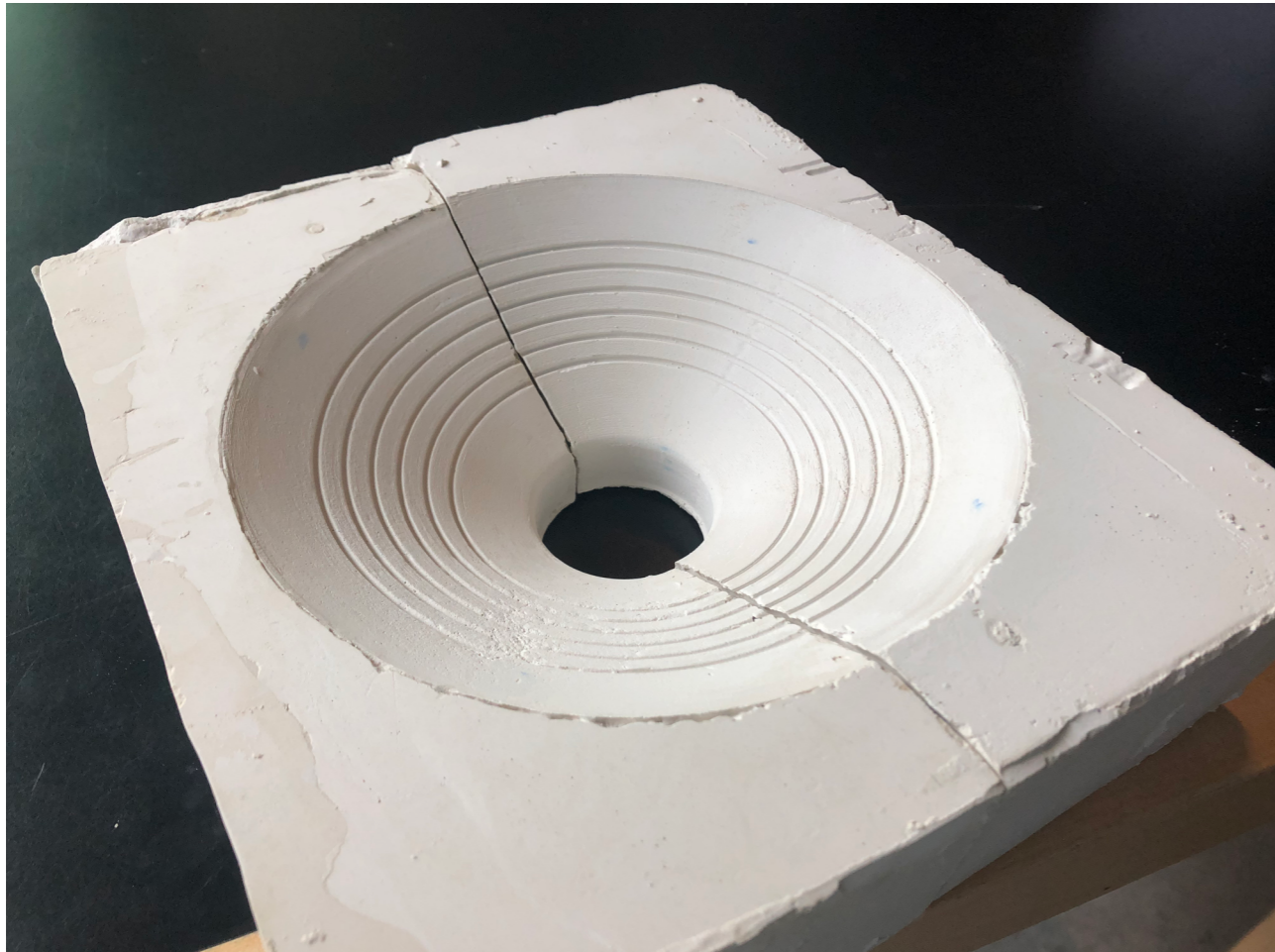
Make prototype

3D print for making plaster models

- Make solid 3D print
- Extent at least 1 cm height on top







I have shipped the plaster molds to the glass blowing factory, but because of COVID-19, they did not give a specific time when they can finish the work. I am looking forward to receiving the final product in the future.

Reflection

In my project, I thought the most difficult part for me was looking for participants. I had never been in contact with visually impaired before and I even had no idea how can I find them. I tried to contact different countries' blind communities, talk with the visually impaired people that I crossed by on the road, seek help from the rehabilitation organization from LTH, join visually impaired people's Facebook groups, and ask possibilities from each individual that I know. I was so lucky to get three participants with help from my classmates. Besides this, managing my time to complete tasks on time is also a big challenge for me. The outbreak of COVID-19 turned the world upside down and limited our space to the corner of the home. Social distancing was a new concept for me and I experienced a very hard time maintaining my daily life as usual. Finally, I found out it is better to maintain a routine around your sleep and wake times, make a schedule for the next day, and keep on doing it.

One of the most important things that I learned from my project is that I realized the importance of research. We all have a certain knowledge and experience regarding the different products. It can be something that we make use of during the design process, but we should always remind us we are not users. Talking to those people who are going to use these products and understanding what they want and what they need rather than make assumptions about what is good for them are crucial for designers. However, doing research could be a very time-consuming and complicated process, if you stick to tried and true methods instead of skipping necessary steps, you can always prove that the products that you make are solving problems and making benefits for users. Furthermore, I gained a better understanding of the design and noticed that designers should always keep patients towards design. Creating a good product cannot be done overnight and experiencing failures is the only way leading to a better design.

In the end, I am happy with what I did and designed. Even though this is not a perfect design, I tried my best to improve my design and finished design tasks on time.

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Appendix

Interview questions

The interview consists of three main sections: I. basic information II. Meal preparation III eating behaviors.

The section I aims to identify whether the participants belong to the target group.

1. What is your name? where are you from?
2. What is the cause of your eye condition?
3. Can you describe your eye condition?
4. Are you living alone?

(If the participant lives together with his/her partner, then additional questions will be asked: what is your partner's eye condition?)

5. Do you cook in daily life?

In section II, I focused on meal preparation regarding the independent respondents without help from sighted individuals. All the questions are designed to figure out what problems they are facing during the cooking process. The meal preparation processes can be divided into three steps: before cooking, during cooking and after cooking.

(1) Before cooking

1. How often do you cook per week?
2. What types of food do you buy/cook/use most often? Why? (breakfast, lunch, dinner)
3. What types of food do you dislike buying/cooking/eating? Why?
4. How do you cut (chop) your food? (vegetables, meat, fruits and so on)
5. What tools do you use for cutting? (peeling, baking...)
6. Are there any difficulties during cutting?

(2) During cooking

1. How do you check if a food is good/bad/ripe/rotten/cooked/done?
2. Do you follow any instructions during cooking? (recipes, books, and internet)
3. How do you measure the different ingredients you need?
4. What tools do you use for cooking?
5. What are the most difficult cooking techniques for you?

(3) After cooking

1. How long does it take for you to prepare the meals that you describe for me previously?
2. Do you have any concerns regarding food storage? (where/how do you keep it?)
3. How do you do the cleaning after cooking?
4. How do you organize your kitchen utensils/ingredients? (how do you organize your food/ingredients? how do you find what you need in the kitchen?)

Section III In this part, the participants will share their experience of having food at home, including eating and drinking.

1. Where do you prefer to have food at home? (how do you move the food to this place)
2. What utensils do you use for eating based on different food? (Is there a type of utensil made for your group?)
3. What types of plates/bowls/containers do you use for keeping food?
4. Do you have any difficulties while you eating food?
5. What types of drinking (tea/coffee/beverages/wine/alcohol) do you prefer? (which occasion?)
6. How do you drink it?
7. Describe the process of drinking them and what difficulties are you facing when you drink them.